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REMARKS

Claims 1-18 and 21-23 are pending in this application.

Claims 1-18 and 21-23 are rejected.

The final office action dated April 21, 2004 indicates that claims 1-5, 8-14, 16-18 and 21-23 are rejected under 35 U.S.C. §103 as being unpatentable over Silverstein 6,339,463 in view of Check III U.S. Patent No. 5,463,491. The remaining claims are rejected under 35 U.S.C. §103 as being unpatentable over Silverstein in view of Check and others. These rejections are respectfully traversed.

Claim 21 recites a visual image display comprising a fiber-optic faceplate; and a suspended particle device (SPD) light valve in optical communication with the fiber optic faceplate. The light valve includes a plurality of particles in a suspension medium.

The suspended particle device light valve is used instead of a liquid crystal light valve and polarizers. Eliminating the polarizers is desirable, since the polarizers are difficult to build, typically have poor transmission and low dichroic ratio, etc.

Silverstein et al. take a different approach toward eliminating the polarizers. Silverstein et al. still use a liquid crystal light valve. However, their liquid crystal light valve is Bragg--diffracting.

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Modulation in Silverstein et al's display occurs with the presence or absence of a Bragg grating structure. The Bragg reflecting liquid crystal light valve reflects light by diffracting the light from a periodic structure that is thick enough compared to the wavelength of the light. Bragg diffraction occurs only when two conditions are satisfied: the normal grating equation and the Bragg condition. In general, these two conditions can be satisfied simultaneously only by a narrow band of wavelengths for a given angle of incidence. Within the band of wavelengths that satisfy the grating and Bragg conditions closely enough, one circular polarization component is reflected. Other wavelengths and polarizations are transmitted through the liquid crystal light valve with little loss, and typically are absorbed by a separate absorbing layer at the back of the light valve.

Since Check is the only secondary reference, the issue is whether Check teaches or suggests the approach taken by the applicant.

Check does not teach or suggest the approach taken by the applicant. Check simply discloses an SPD film suitable for use as a light modulating unit of an SPD light valve.

Check does not teach or suggest that suspended particle devices can replace liquid crystal light valves in displays. Check makes no mention of liquid crystal displays, but rather teaches that his SPD film is an improvement over similar light valves having suspensions of particles in a fluid. Check makes no mention of the advantage of suspended particle devices relative to liquid crystal displays, specifically that they do not require polarized light, and hence can be brighter in their "on" state, and that they do not require polarizers.

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The office action offers advantages (increased contrast, and reduced light scatter) of using a suspended particle device in place of a liquid crystal light valve. It alleges that support for these advantages is provided at col. 2, lines 4-6 and 17-20. However, the undersigned has reviewed those passages in both Silverstein and Check, and did not see where either document offers advantages of using a suspended particle device in place of a liquid crystal light valve. Besides, the suspended particle device without a faceplate is potentially quite bright, so the prior art provides no reason, incentive or motivation to add a fiber faceplate to increase the brightness.

Moreover, there are significant structural differences between a liquid crystal light valve and a suspended particle device. Liquid crystal molecules do not absorb light in any orientation, as do the SPD particles. In contrast to a liquid crystal light valve, a suspended particle device contains particles with intrinsic absorption that are anisotropic in shape. In absence of an applied field, the particles will be randomly oriented due to the random thermal motion of the fluid, some number of them being oriented in such a way as to absorb the light passing through the display. When an AC field is applied, the particles orient with their length parallel to the applied field, which allows light to propagate in the same general direction, with little or no absorption.

The office action admonishes the undersigned for his analysis of Check in the previous response, stating "one cannot show nonobviousness by attacking the references individually where the rejections are based on a combination of references". Thus, the office action admonishes the undersigned for a

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mechanical analysis of obviousness, rather than looking at the teachings as a whole.

However, it is the office action that performs the mechanical analysis of obviousness. Instead of looking at the teachings of the references on the whole, the office action finds a patent disclosing a display with a faceplate and a liquid crystal light valve, but no polarizers (Silverstein et al); finds a patent disclosing a suspended particle device (Check); and baldly concludes that it would be obvious to replace the liquid crystal light valve with the suspended particle device. The office action does not consider that Silverstein's approach is fundamentally different than the applicant's, that liquid crystal light valves are structurally different than suspended particle devices; and that the prior art offers no reason, incentive or motivation to use a suspended particle device in combination with a liquid crystal light valve.

The office action seems to argue that simply because Check discloses a suspended particle device, it would be obvious to use the SPD device in Silverstein's display. However, MPEP 2143.01 states "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "

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For these reasons, claim 21 and its dependent claims 22-24 should be allowable over the combination of Silverstein and Check. Claim 24, which has been added to the application, should also be allowable over the combination of Silverstein and Check.

Claim 1 has been amended to depend from claim 21. Claim 1 and its dependent claims 2-10 should also be allowable over the combination of Silverstein and Check.

Claim 11 has been amended to recite a visual image display comprising a fiber-optical faceplate; a layer underneath the faceplate; and a pair of electrodes positioned in contact with opposite surfaces of the layer. The layer includes a liquid light valve suspension and particles suspended in droplets of the liquid light valve suspension. The particles are capable of absorbing or reflecting light. Orientations of the particles depend on an application of an electric field to the electrodes.

Claim 11 should be allowed over the combination of Silverstein et al. and Check for the reasons above. Claims 12-15, which have been amended to depend properly from amended claim 11, should also be allowed over the combination of Silverstein et al. and Check.

Claims 25-26 have also been added to the application. Claim 25 recites apparatus comprising a substrate; a color filter on the substrate; a suspended particle device on the color filter; and a fiber-optic faceplate on the suspended particle device.

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In a combination of a suspended particle device and color filter, the color filter can reduce the brightness of the suspended particle device. However, adding the faceplate to the combination increases the brightness and thereby makes up for the loss of brightness caused by the color filter.

The apparatus of claim 25 is not taught or suggested by the documents made of record. The office action states that it would be obvious to adapt the configuration disclosed in Silverstein U.S. Patent No. 5,442,467 (Silverstein 2). However, the reasons for the rejection are vague, as the office does not explain how Silverstein 2 would be adapted, or how the combined teachings of Check, Silverstein et al, and Silverstein 2 would produce the apparatus of claim 25. Clarification is respectfully requested.

New claim 26, which depends from claim 25, recites means for sealing the suspended particle device to the faceplate. The means allows motion of the faceplate relative to the suspended particle device. None of the documents made of record teach or suggest that such relative motion is acceptable. For this additional reason, claim 26 should be allowed over the documents made of record.

An added claims fee has not been incurred by the addition of claims 24-26. The total number of independent claims stands at three, since amended claim 1 is now a dependent claim; and the total number of claims stands at twenty one, since claims 16-18 have been cancelled.

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The Examiner is respectfully requested to withdraw the rejections and issue a notice of allowability. If any issues remain, the Examiner is invited to contact the undersigned.